

WHAT IS CLAIMED IS:

- 1 1. A triple push pull optical tracking method comprising:
2 receiving a set of three reflectance values from three optical spots on a
3 recording medium;
4 generating three S-curves by pair-wise subtraction of reflectance values;
5 generating a linear position estimate by processing the S-curves; and
6 serving a recording head to the recording medium.
- 1 2. The method of claim 1 wherein the three reflectance values are digitized.
- 1 3. The method of claim 1 wherein equal distances separate the three optical spots
2 across a track.
- 1 4. The method of claim 1 wherein serving the recording head comprises
2 comparing a desired position of the recording head to a measured position from the linear
3 position estimate.
- 1 5. The method of claim 1 wherein the recording medium is a linear magnetic
2 tape.
- 1 6. The method of claim 5 wherein the three optical spots result from servo tracks
2 on a magnetic side of the linear magnetic tape.
- 1 7. The method of claim 5 wherein the three optical spots result from servo tracks
2 on a non-magnetic side of the linear magnetic tape.
- 1 8. The method of claim 1 wherein the recording medium is an optical disk.
- 1 9. A triple push-pull system for generating a composite signal in a closed loop
2 servo signal of a data recording system to drive a recording head to any given position within
3 any given track comprising:

optical pickup means for generating three optical spots focused on a recording medium, the spots separated by equal distances across a track, the optical pickup means receiving a set of reflectances from the three spots;

media means for providing the servo tracks responsive to optical spot illumination;

electronic means for generating a set of three filtered signals from the three reflectances and generating a set of three S-curves by pair-wise subtraction of the filtered signals;

processing means to generate a composite servo position signal from the S-curves and filtered reflectances; and

servo means for driving the recording head to a desired position by comparing the desired position to a measured position from the composite servo position.

10. The system of claim 9 wherein the media means is a linear magnetic tape system.

11. The system of claim 10 wherein the servo tracks are provided on a magnetic side of a recording medium of the linear magnetic tape system.

12. The system of claim 10 wherein the servo tracks are provided on a non-magnetic side of a recording medium of the linear magnetic tape system.

13. The system of claim 9 wherein the optical spots are separated by one-third track pitch in a direction across the servo tracks.

14. The system of claim 10 wherein a servo track comprises a series of marks in a form of depressed pits on a back coating of the recording medium.

15. The system of claim 12 wherein a servo track comprises a series of marks in a form of depressed pits on a back coating of the recording medium.

1 16. The system of claim 9 wherein each reflectance value maximum amplitude is
2 normalized to a constant value.

1 17. The system of claim 9 wherein processing means to generate a composite
2 servo position signal from the S-curves and filtered reflectances comprise:

3 choosing the pair of reflectance values with the largest amplitude gradient; and
4 adjusting the chosen s-curve position estimate for the zone based on a slope and an
5 offset.

1 18. The system of claim 9 wherein individual s-curve position estimates are
2 blended together to generate a continuous position estimate as individual linear sections are
3 traversed.

1 19. The system of claim 9 wherein the closed loop servo system comprises a
2 digital processor, the digital processor used to perform the composite servo position
3 calculations from the reflectance values, derive a position error signal based on the position
4 estimate and a commanded position, compensate the error signal in such a way as to reduce
5 the lateral tape motion, and command an actuator to follow the lateral tape motion.

1 20. A method of generating a composite signal in a closed loop servo signal of a
2 data recording system to drive a recording head to any given position within any given track
3 comprising:

4 generating three optical spots focused on a recording medium, the spots separated by
5 equal distances across a track;

6 receiving a set of reflectances from the three spots;

7 generating a set of three filtered signals from the three reflectances;

8 generating a set of three S-curves by pairwise subtraction of the filtered signals;

9 generating a composite servo position signal from the S-curves and filtered
10 reflectances; and

11 driving the recording head to a desired position by comparing the desired
12 position to a measured position from the composite servo position.

1 21. The method of claim 20 wherein the recording medium is a linear magnetic
2 tape system.

1 22. The method of claim 21 wherein servo tracks are provided on a magnetic side
2 of the recording medium of the linear magnetic tape system.

1 23. The method of claim 21 wherein servo tracks are provided on a non-magnetic
2 side of a recording medium of the linear magnetic tape system.

1 24. The method of claim 20 wherein the optical spots are separated by one-third
2 track pitch in a direction across servo tracks.

1 25. The method of claim 20 wherein a servo track comprises a series of marks in a
2 form of depressed pits on a back coating of the recording medium.

1 26. The method of claim 23 wherein a servo track comprises a series of marks in a
2 form of depressed pits on a back coating of the recording medium.

1 27. The method of claim 20 wherein generating the set of three filtered signals
2 comprises:

3 converting electronic current from the reflectances to voltages;

4 generating the S-curves; and

5 reducing noise in the S-curves.

1 28. The method of claim 20 wherein each reflectance value maximum amplitude
2 is normalized to a constant value.

1 29. The method of claim 20 wherein generating a composite servo position signal
2 from the S-curves and filtered reflectances comprise:

3 choosing the pair of reflectance values with the largest amplitude gradient; and
4 adjusting the chosen s-curve position estimate for the zone based on a slope and an
5 offset.

1 30. The method of claim 20 wherein individual s-curve position estimates are
2 blended together to generate a continuous position estimate as individual linear sections are
3 traversed.